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EXAMINER

CALANDRA, ANTHONY J

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/577,434	Applicant(s) BENAOUDIA ET AL.	
	Examiner ANTHONY J. CALANDRA	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Office Action

The communication dated 10/9/2009 has been entered and fully considered.

Claim 2 is canceled. Claims 1, 3-13 are pending.

Response to Arguments

Applicant asks for clarification on the rejection of claim 7 and 8:

The limitations of claim 7 were dealt with in claim 1 in the non-final action dated 5/12/2009, *"The computer is shown to iteratively repeat measurements [Figure 7] and data collection while monitoring for undesirable conditions and the cause of said conditions (comparing predicted values) and then deciding corrective actions (optimizing the bleaching dosage)."* The examiner notes the applicant was correct that claim 8 was mislabeled as claim 7 in the body of the rejection.

Applicant argues that the instant claims define a mix of species.

XIA discloses that species are an important factor in the process control for determining brightness variable [pg. 594 column 1]. The word species is used both for the singular and the plural. The person of ordinary skill in the art is limited to only two interpretations, a single species, or a mix species. As there are only two possible choices the person of ordinary skill in the art would instantly recognize both single and mixed species. It is well known in the art that typical refining pulping uses both single and mixed species stands of wood as evidenced by

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Wood Utilization for Ecosystem Management by WILLITS et al. [pg. 2 column 1 {pg. 4 of pdf document}].

Applicant argues that the predictive model is based on a proportional relationship between wood chip size and the predictive brightness level.

On the outset there doesn't appear to be written descriptive support for the proportional model in the specification. The examiner interprets proportional model to be $y = mx + b$ where x is chip size and y is brightness and b is some offset. While the applicant shows an increase in brightness by changing size of 7.9%, only two points were tested a lower bound of 16.49 and a higher bound of 21.29. When taking any two points a straight line can be drawn through them with an R^2 value of 1. SAHLBERG reasonably teaches the effect of knot content a surrogate for chip size. SAHLBERG shows that as knot content increases bleaching requirements increase. SAHLBERG shows at least two linear proportional sections, one between 0-2% knots and a second between 2 and 50% knots. The examiner further notes that XIA is a learning program. Once chip size is decided to be a parameter it will learn the optimum responses to chip size including a proportional model between various end points [pg. 594 column 1 "automatically learning optimal operation conditions"].

Applicant argues that the instant claimed invention shows the opposite results of the combination of XIA/DING/SAHLBERG. Specifically the applicant argues that the results shown that increasing chip size require less bleaching which is in contrast to what would be expected {applicant presents as support Table IV}. Applicant further argues that SAHLBERG

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shows the opposite effect again showing increasing chip size a surrogate for knots to show decreasing brightness/and increasing peroxide with increasing chip size. As both what the person of ordinary skill in the art would expect and what SAHLBERG teaches are opposite of the instant claimed invention the results are unobvious.

There must be a nexus between the unexpected results and the claim as written. The unexpected results shown by the applicant are for a narrow range of chip sizes specifically 16.49 – 21.39 [Table 4] (it is not clear what sizes these numbers even mean or how to translate them into various chip dimensions). However, as currently written the claims are not limited to a specific size range. As such the applicant has only shown unexpected results for a single range while trying to claim the totality of ranges. As SAHLBERG teaches overthick and oversize chips contain a high amount of knots which impair bleaching. It is not clear that the range given by the applicant even contains any chips within the size range which comprise overthick/oversize chips. Finally, the examiner notes that XIA is a predictive model, once wood chip size has been decided as a parameter XIA will learn and optimize bleaching chemicals for the wood treated, thus even if the relation between size and brightness were incorrectly made by the person of ordinary skill in the art XIA would eventually make a correct model.

Applicants surmise that the explicit effect shown in SAHLBERG compared to the instant invention is due to a mix of chips which would overcome any adverse effects due to knots.

The applicant does not claim any specific mix of chips or range of mix of chips. Certainly 99.9% of one species with knots and 0.1% of another species wouldn't overcome the knot effect shown by SAHLBERG. A more reasoned hypothesis is that the small range that the

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applicant used didn't comprise many oversized/overthick chips. This again goes to the issue that the applicant is claiming a broad range while only having an unexpected result for a small range.

Specification

1. The amendment filed 10/9/2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The applicant does not appear to have prior support for the predictive model being based upon proportional based model between brightness and chip size.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1 and 3-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed

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invention. The applicant does not appear to have prior support for the predictive model being based upon proportional based model between brightness and chip size.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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1. Claims 1-5, 7, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Integrated Intelligent Control System for Peroxide Bleaching Processes* by XIA et al., hereinafter XIA, in view of *Economizing the Bleaching Agent Consumption by Controlling Wood Chip Brightness* by DING et al., hereinafter DING, and , if necessary, *Influence of knot fibers on TMP properties* by SAHLBERG, hereinafter SAHLBERG.

As for claim 1, XIA discloses wood species and chip quality as important variables which affect brightness [pg. 594]. XIA does not disclose specifically measuring reflectance related data of wood chips. Examiner notes that wood species has a very large effect on reflectance of wood chips (cherry wood is much darker than say balsa wood). DING discloses a system that is capable of measuring wood chip reflectance data and that said data affects brightness after bleaching [abstract, Conclusion]. At the time of the invention it would have been *prima facie* obvious for a person of ordinary skill in the art to apply a known measurement system such as taught by DING to improve the control system taught by XIA. Both XIA and DING look to control pulp brightness resultant from bleaching of mechanical pulp. The chip measurements taught by DING would have the predictable result of improving the neural network modeling of XIA as chip reflectance is shown to have a direct effect on brightness.

XIA discloses a control system which is capable of controlling multiple affecting factors such as caustic, peroxide and silicate through the use of a neural network containing intelligent control system [abstract, pg. 594]. XIA discloses a method to control quality parameters such as brightness, freeness and bulk [594]. While XIA discloses both peroxide and chip quality as effecting factors and pulp brightness as the quality factor that is being affected it only teaches the use of the system in general. As such, XIA teaches the method steps of the instant claims but

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does not give the specific example of using peroxide, brightness, and wood chip quality and instead teaches more than just those factors.

XIA discloses initial information being inputted into the computer including peroxide charge [Figure 3] and discloses chip data being fed into the computer [Figure 3]. XIA discloses that the action variable and operational conditions are fed into the matrix simulator which outputs resultant variables. Brightness is shown to be controlled by chip quality and peroxide as two of many factors [Figure 3]. The computer is shown to iteratively repeat measurements [Figure 7] and data collection while monitoring for undesirable conditions and the cause of said conditions (comparing predicted values) and then deciding corrective actions (optimizing the bleaching dosage).

XIA discloses chip quality [pg. 594]. Wood chip size is a chip quality feature that is important in refining. Large chips will tend to be refined poorly and as such will require more bleaching. XIA states that bleach plant brightness is dependent on specific energy and wood chip species/chip quality. Specific energy is a refining parameter affected by chip size, therefore chip size has an effect on bleach plant brightness. It is the examiner's position that chip size is such a well known quality factor for refining and that the term 'chip quality' would be instantly recognizable to the artisan of ordinary skill in the art as including 'chip size'. However, if necessary, as the applicant disagrees, the examiner presents SAHLBERG. SAHLBERG discloses that over-thick and over-sized chips tend to contain knots [pg. 163 column 2]. SAHLBERG discloses that chips with high knot content consume more peroxide and have a lower brightness [Table III]. Therefore, chip size, which is a surrogate for knot content, is a chip quality parameter that is known by those of ordinary skill in the art to affect the bleachability of

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mechanical pulp. At the time of the invention it would have been obvious to a person of ordinary skill in the art to measure the chip quality parameter, chip size, as taught by SAHLBERG, to improve the control system of XIA/DING. A person of ordinary skill in the art would expect that by measuring chip size distribution as one of the chip quality parameters the brightness and required peroxide could be better calculated/controlled. Finally, the examiner notes that XIA is a predictive model, once wood chip size has been decided as a parameter XIA will learn and optimize bleaching chemicals for the wood treated, thus even if the relation between size and brightness were incorrectly made by the person of ordinary skill in the art XIA would eventually make a correct model.

As for claim 3, DING discloses that wood chip moisture affects brightness [conclusion].

As for claim 4, XIA discloses a neural network [abstract]. XIA further discloses that experimental data (lab testing) is fed into the computer system [Figure 1]. Examiner has interpreted the lab testing as the training data for the neural network contained within. Further, XIA discloses continuous training as it shows the matrix simulator continuing to receive data back and forth from the control system [Figure 7].

As for claim 5 and 7, XIA does not explicitly state that the wood pulp is made from a refining process; however this is implicit within the reference. XIA discloses that specific energy is an important process variable (kwhr/t) which affects the pulp properties [pg. 594]. Specific energy is a unit of measure used in refining. XIA discloses that the control system is hooked up to the DCS which can control affective factors such as peroxide, caustic, and silicate charge. The computer is shown to iteratively repeat measurements [Figure 7] and data collection while monitoring for undesirable conditions and the cause of said conditions

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(comparing predicted values) and then deciding corrective actions (optimizing the bleaching dosage).

As for claim 9, examiner recognizes that applicant has attempted to invoke 112 6th paragraph by using the 'means for language'. Examiner has interpreted the 'means for estimating a set of wood chip properties' as a CMS or functional equivalent. Applicant does not explicitly disclose what the 'means for comparing' or 'means for optimizing' are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs which include a neural network.

XIA discloses an apparatus capable of controlling a pulp bleaching system using a neural network [Figure 2 and abstract]. XIA discloses further discloses data processor means implementing a predictive model receiving at corresponding inputs thereof said wood chip properties data and an initial bleaching agent dosage value for generating predicted brightness value of pulp to produce from said wood chips, to estimate the optimal bleaching agent dosage for which said predicted brightness value substantially reaches said required brightness value [abstract, pg.1 Architecture of IOMCS, Figure 3]. It is the examiner's position that the software and computer neural network of XIA includes a 'means for comparing' and a 'means for optimizing' in its software module.

XIA discloses that the properties of wood species and chip quality are measured and affect final pulp quality but does not disclose how they are measured [pg. 594]. DING discloses a CMS system that is capable of measuring chip properties [abstract], the CMS can also be programmed to measure two-dimensional chip readings [future works]. At the time of the invention it would have been *prima facie* obvious for a person of ordinary skill in the art to use

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the CMS system of DING with the neural network of XIA. It is obvious to apply a known measurement technique of a CMS to a known device such as the neural network of XIA. The CMS system would improve the neural network system of XIA by being able to measure additional chip properties which effect pulp quality such as moisture and brightness. In addition to the CMS system chip size could also be determined by size classification through screening as discussed in SAHLBERG [pg. 163 column 3].

As for claim 10, XIA discloses that the apparatus includes a neural network [abstract]. Figure 1 shows lab testing (experimentally derived data) information being fed into the computer apparatus containing the neural network [figure 1, abstract], which can control pulp brightness.

As for claim 11, examiner notes that applicant has invoked 112 6th paragraph by using the ‘means for language’. Examiner has interpreted the ‘means for adding a bleaching agent’ to be a pipe and control valve run by a control system. XIA discloses a neural network with the capability for controlling the optimum bleaching agent [abstract, Figure 7]. XIA does not explicitly disclose that the pulp being sent to bleaching has been refined; however this is implicit in the reference as it states the input parameter of specific energy, kwhr/t, which is a unit of measurement for refiner energy. The future DCS (Digital control system) connection disclosed by XIA is a means for adding bleaching agent to produce bleached pulp [Figure 7]. Control valves and pipes while not disclosed by XIA are well known in the art and used in all modern bleach plants.

2. Claims 6, 8, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Integrated Intelligent Control System for Peroxide Bleaching Processes* by XIA et al.,

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hereinafter XIA, in view of *Economizing the Bleaching Agent Consumption by Controlling Wood Chip Brightness* by DING et al., hereinafter DING, and if necessary, *Influence of knot fibers on TMP properties* by SAHLBERG, hereinafter SAHLBERG, as applied to claims 1, 3-5, 7, 9-10 above, and further in view of U.S. 2003/0149493 BLEVINS et al., hereinafter BLEVINS, as evidenced by *Quality Prediction by Neural Network for Pulp and Paper Processes* by KIM et al., hereinafter KIM.

As for claims 6 and 8, XIA/DING/SAHLBERG do not explicitly disclose an attenuation of estimated wood chip properties caused by a time delay. However, to have accurately modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips since there are multiple processing steps in between chip property measurement and pulp brightness measurement including refining as disclosed by XIA/DING/SAHLBERG (i.e. no delay the predicted brightness would be based on chips that are just being tested and haven't been refined yet/bleached yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips were subject to bleaching such that more accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of XIA/DING/SAHLBERG. The time delay would predictably

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provide more accurate process control. Both BLEVINS and XIA/DING/SAHLBERG teach advanced control methods, further BLEVINS and XIA/DING/SAHLBERG deal with brightness control. With the inclusion of time-delay processing XIA would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [Figure 7 continuous control system pg. 597 Fault reasoning technique].

As for claims 12 and 13, examiner notes that applicant has invoked 112 6th paragraph by using the ‘means for language’. Examiner has interpreted the ‘means for adding a bleaching agent’ to be a pipe and control valve run by some type of control system. Applicant does not explicitly disclose in the specification what the ‘means for estimating’, ‘means for time delaying’, ‘means for time delaying’ are other than software running on a computer and as such examiner has interpreted such means as software programs/advanced control programs. Finally, the examiner notes that XIA is a predictive model, once wood chip size has been decided as a parameter XIA will learn and optimize bleaching chemicals for the wood treated, thus even if the relation between size and brightness were incorrectly made by the person of ordinary skill in the art XIA would eventually make a correct model.

XIA/DING/SAHLBERG do not explicitly disclose time delay means. However, it is the position of the examiner that the computer as described by XIA would be capable of adding a time delay. Further, to have accurate modeled correlation data it is necessary to have such a delay. Without such a delay the predicted brightness would be based on the input parameters for the wrong chips since there are multiple processing steps in between chip property measurement and pulp brightness measurement including refining as disclosed by XIA (i.e. no delay the

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predicted brightness would be based on chips that are just being tested and haven't been refined yet and thus give inaccurate results). As such it would have been obvious to a person of ordinary skill in the art to optimize the time of delay signal such that the measured chip quality inputs matched with when the same chips were subject to bleaching such that more accurate data/results would be obtained. Further, people of ordinary skill in the art recognize time delay as an important variable which neural networks can handle as evidenced by [KIM pg. 105 paragraph 2 and 3]. Alternatively, BLEVINS discloses the use of a variable time delay that can account for delays in process when using model predictive control [abstract]. It is *prima facie* obvious to apply one known technique such as time delay of BLEVINS to the known neural network predictive control system of XIA/DING/SAHLBERG. The time delay would predictably provide more accurate process control. BLEVINS and XIA/DING/SAHLBERG teach advanced control systems, further BLEVINS and XIA/DING/SAHLBERG deal with brightness control. With the inclusion of time-delay processing XIA would continue to feed the error signal back into the optimization module and performing several iterations and then taking corrective action on peroxide charge with the advanced time control attenuation [section 3.3 and figure 5]. XIA further discloses means for comparing, a predictive model and means for adding a bleaching agent [Figure 7].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571) 270-5124. The examiner can normally be reached on Monday through Thursday, 7:30 AM-5:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AJC/

/Eric Hug/
Primary Examiner, Art Unit 1791